

Attorney Docket No. 11371-93
Siemens AG Ref. No. 2003P06492WOUS
Substitute Specification With Markings

RADIO NETWORK FOR PROTECTING ELECTRONIC DEVICES FROM
ELECTROMAGNETIC RADIATION OF A MOBILE STATION

TECHNICAL FIELD

[0001] Thise invention application relates to a protective device and a method for protecting a second device from the electromagnetic radiation of a first device, ~~radio network~~, particularly for use in hospitals.

~~BACKGROUND, and to a method for operating a radio network.~~

[0002] Wireless communications networks, and especially radio networks known by the name Wireless Local Area Network (WLAN) (~~wireless local area network~~), are often used in buildings.

[0003] Restrictions in the use of such radio networks often arise because of other devices that are sensitive to electromagnetic radiation, especially in hospitals. In areas where devices, such as respirators, which might be affected by electromagnetic radiation are located, radio networks are therefore typically not used.

[0004] A protective device and method are known, for instance, from US Patent 6,343,213 B1

[0005] From US Patent disclosure 2003/0114104A1, to assure safe wireless communication between a central access point and a mobile device via a BLUETOOTH interface, ascertaining the difference between the access point and the mobile device with the aid of a Radio Frequency Identification (RFID) system is provided. Only within a range from the access point that is determined via the RFID is communication permitted.

[0006] A system for converting the operating mode of mobile radio devices in threatened areas, such as hospitals, is for instance known from US Patent 6,343,213 B1. In this case a base station can send a signal to the portable radio device that causes a switchover to lower power or a shutoff of the portable radio device.

[0007] A further system for protecting a defined area against effects from portable radio devices is known from European Patent Disclosure EP 1 035 746 A1. In this system, protective devices are provided that operate independently of the telecommunications system, and in particular with different radio frequencies.

SUMMARY

[0008] ~~_____ The object of the invention is to achieve additional fields of use for radio networks in areas where devices that are sensitive to electromagnetic radiation are located, especially in hospitals.~~

[0009] ~~_____ This object is attained according to the invention by Aa radio network having the characteristics of claim 1 and by a method for operating a radio network are described. having the characteristics of claim 6. Here Aa first device is a device of the radio network that has a transmitter, while a second device is a device that is to be protected against the electromagnetic radiation of the transmitter. One of the two devices has a wireless interrogation system or transceiver, which cooperates with a reflecting device, in particular a transponder, of associated with the other device.~~

[0010] ~~_____ The interrogation system, together with the reflecting device, forms a contactless detection system, which furnishes the first and/or second device with at least approximate information about the distance between the two devices. Preferably, Tthe device in the radio network that has the transmitter may is at the same timealso be equipped with the interrogation system as well, while the second device that is sensitive to the electromagnetic radiation of the radio network has the reflecting device, preferably embodied aswhich may be a~~

transponder. In this configuration, the electromagnetic ~~load-field impinging~~ on the second device, which is threatened by electromagnetic radiation, ~~and in particular for example, is a~~ medical device, can be monitored and controlled ~~overall~~.

[0011] Depending on the type and size of the first and second devices, among other factors, ~~however, the second~~ device, to be protected against the electromagnetic radiation of the radio network, may also have a transceiver unit of a contactless interrogation system, while the first device, forming part of the radio network, has a corresponding reflecting device.

[0012] -Depending on the distance between the devices, measured by means of the contactless proximity measuring system, a switchover ~~is~~ may be made between two different operating modes, ~~namely a normal operating mode and a special operating mode.~~ The latter mode is intended for shorter distances of separation between the devices which is associated with higher electromagnetic field strength. ~~of at least one of the devices. The term "distance" should be understood to mean a distance signal that is dependent on the distance and is measurable by the measurement system.~~ In addition to the geometric physical spacing between the devices, the electromagnetic field strength may be affected by any possible influence of the radiation, originating at the transmitter, because of

radiation-absorbing or _____-reflecting elements. ~~is taken into account. In other words, W~~what is ~~decisive determinative~~ for the switchover between the various operating modes is the degree of attenuation of the transmitted electromagnetic radiation, ~~originating at the transmitter,~~ at the location of the second device and thus the electromagnetic field strength.

[0013] In a first ~~embodiment~~aspect, the transmit power of the transmitter of the first device is set differently in the various ~~transmission~~operating modes. The transmit power can be reduced in stages or continuously here. In the event of impermissibly high electromagnetic field intensities in the area of the second device, the transmitter may ~~the~~be ~~possibility also exists of~~ automatically switched ~~ing off the transmitter~~ automatically. A threat to the second device from the transmission unit of the contactless interrogation system, conversely, need not as a rule be assumed.

[0014] Accordingly, both in embodiments in which the interrogation system ~~is~~may be integrated ~~associated~~ with the first device, ~~as is preferably provided,~~ and in embodiments in which the first device includes only the reflecting device, the interrogation system is typically operated at constant operating parameters, and in particular a constant ~~transmission~~transmit power. A threat to the second device from the transmission unit of the

contactless interrogation system, is generally not
encountered. However, if ~~if~~ a threat to the second device by
the electromagnetic radiation ~~occurring~~ transmitted in the
operation of the interrogation system cannot be precluded,
~~then in a departure from the above,~~ it is also possible to
vary the operating parameters of the interrogation system,
such as the transmit power, as a function of the measured
distance ~~distance~~ or the electromagnetic field strength
measured between the two devices.

[0015] ~~In addition or as alternative to varying the~~
~~transmit power, in a preferred refinement, another aspect,~~
the outputting of a warning report by one of the devices as
a function of the operating mode ~~is~~ may be provided.
Independently of, or in addition to, a generated warning
report, the possibility of an automatic shutoff of the
second device that is to be protected ~~can~~ may be provided
for. Preferably, the device that is threatened by the
electromagnetic radiation may automatically adapts its
operation to the threat. In an especially preferred
~~embodiment,~~ yet another aspect, if an approach between the
two devices is detected by the contactless proximity
measuring system, a switchover of the operating mode of
both the first, threatened ~~engineered~~ device and the second,
threatened device is provided, and stopping the operation
~~is~~ may also be included as a special case of an operating
mode switchover.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] ~~One exemplary embodiment of the invention is described in further detail below in conjunction with a drawing.~~

[0017] An example is described in further detail below with reference to the drawings.

[0018] FIG. 1 The sole drawing figure shows a schematic layout plan of a radio network. in the form of a schematic layout plan.

DESCRIPTION

[0019] Reference will now be made in detail to examples, but it will be understood that it is not intended to limit the invention to such examples. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention which, however, may be practiced without some or all of these specific details. In other instances, well known process operations have not been described in detail in order not to unnecessarily obscure the description.

[0020] A radio network 1, installed for instance in a hospital, may includes, in addition to a number of fixed stations, not shown, a typically mobile mobile device 2,

which has a transmitter 3. A second device 4, for instance a respirator, which is not part of the radio network 1, is potentially threatened by the electromagnetic radiation, originating at the transmitter 3, of the first device 2, such as a mobile phone or a tablet computer.

[0021] The second device 4 has at least one and ~~preferably may have~~ a plurality of reflecting devices 5, in the form of transponders (TAGs), which are, for instance, glued in the form of labels to the second device 4. Alternative, reflecting devices 5, for instance in the form of small tubes, may be secured to the second device 4. Cooperating with the reflecting devices 5, in a manner known ~~per se~~, for instance, from German Patent DE 197 03 823 C1, is an interrogation system 6 of the first device 2, this system including a transceiver unit. The transmitter (not shown), ~~not identified by reference numeral,~~ of the interrogation system 6 ~~is may not necessarily be~~ part of the radio network 1. The electromagnetic radiation originating in the transmitter of the interrogation system 6 is represented symbolically by concentric circles in the drawing and defines a detection range 7, within which the interrogation system 6 can detect the presence of a reflecting device 5. The detection range 7 typically extends over a distance on the order of magnitude of 1 m from the first device 2. The result is a safety zone 8 surrounding the second device 4, ~~and shown~~ drawn in dashed lines. ~~If~~ When the first device 2 is moved into the safety zone 8, ~~then~~ the first device 2 may automatically switches

~~over~~ from a first operating mode, that is, ~~the~~ a normal operating mode N2, to a second operating mode, ~~the~~ a special operating mode S2.

[0022] The operating parameters of the special operating mode S2 are ~~adjustable~~ configurable. When in the safety zone 8, ~~It is preferably provided that t~~he transmitter 3 of the first device 2, ~~in the safety zone 8,~~ may operate with reduced ~~s the transmission transmit~~ power or ~~stops the~~ cease operation partially or completely, in order to preclude a threat to the second device 4. ~~It is also provided that T~~he first device 2~~8~~, upon being positioned in the safety zone 8, may ~~outputs~~ a warning report, which ~~for instance may~~ warns against operating the first device 2 in the vicinity of the second device 4, or prompt calls for the removal of ~~ing the first device 2 out of from the~~ safety zone 8.

[0023] In another example, ~~As an alternative to the exemplary embodiment shown,~~ the threatened second device 4 can also have the interrogation system 6, while the first device 2 that includes the transmitter 3 has at least one reflecting device (TAG) 56. ~~In that case, in an especially simple way,~~ T~~he~~ second device 4, which reads out the interrogation system 6, can output a warning report upon the approach of the first device 2. ~~An especially simple possibility is also created for stopping T~~he operation of the second device 4 may also be stopped in response to the

threat from the electromagnetic radiation originating in the first device 2, by means of a switchover from a normal operating mode N4 to a special operating mode S4, for instance an emergency operation program. The provision of a reflecting device 56 on the first device 2 furthermore has ~~the an~~ advantage that permanently equipping the first device 2 with a wireless interrogation system ~~is~~ may be unnecessary; instead, as needed, for instance solely while in a threatened area such as a hospital, the reflecting device 5 can be secured to the first device 2, by, for instance being glued to it or clipped to it the first device.

[0024] Although the present invention has been explained by way of the examples described above, it should be understood to the ordinary skilled person in the art that the invention is not limited to the examples, but rather that various changes or modifications thereof are possible without departing from the spirit of the invention. Accordingly, the scope of the invention shall be determined only by the appended claims and their equivalents.